Title: Algebra Across the Year

Brief Overview:

The focus of this unit will be incorporating increasingly difficult algebraic problem-solving activities into the existing curriculum. Three example activities are described which could be taught in each of the first three marking periods. Additionally, extensions for each marking period are provided, and suggestions for the fourth marking period activities are provided.

NCTM 2000 Principles for School Mathematics:

. **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

. **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

. **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

. **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

. **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

. **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

. **Content Standards**

Algebra
. Understand patterns, relationships, and functions.
. Represent and analyze mathematical situations and structures using algebraic symbols.
. Use mathematical models to represent and understand quantitative relationships.

. **Process Standards**

Problem Solving
. Build new mathematical knowledge through problem solving.
. Solve problems that arise in other contexts.

- Apply and adapt a variety of appropriate strategies to solve problems.
- Monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof
- Recognize reasoning and proof as fundamental aspects of mathematics.
- Make and investigate mathematical conjectures.
- Develop and evaluate mathematical arguments and proofs.
- Select and use various types of reasoning and methods of proof.

Communication
- Organize and consolidate their mathematical thinking through communication.
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- Analyze and evaluate mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.

Connections
- Recognize and use connections among mathematical ideas.
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- Recognize and apply mathematics in contexts outside of mathematics.

Representation
- Create and use representations to organize, record, and communicate mathematical ideas.
- Select, apply, and translate among mathematical representations to solve problems.
- Use representations to model and interpret physical, social, and mathematical phenomena.

Grade/Level:

Grades 4-6

Duration/Length:

Each lesson presented can be done in 1-2 class periods of 45 minutes. The extension activities are provided to extend the concepts throughout the quarter, along with any lessons that the individual teacher acquires.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Exploring patterns with movement, models, drawings, and/or charts
- Describing patterns

Student Outcomes:

Students will:

- Use function machines to recognize, predict, and describe patterns.
- Write rules as algebraic equations, using appropriate variables.
- Use and construct tables to discover rules and find nth terms.
- Use and construct tables to organize reasonable guesses to solve two variable story problems.
- Communicate mathematically, using appropriate vocabulary.

First Marking Period: Fun with Functions

Sample Activity: The Mysterious Machine

Materials/Resources/Printed Materials:
- Medium-sized box covered in aluminum foil (or other decoration) with a slot opening on both sides and any extra buttons, levers, or other additional materials with which you wish to decorate the box
- Screwdriver or other available tool
- Numbered index cards (use numbers in examples below); blank index cards
- Teacher Resource Sheet # 1 copied onto overhead transparency; overhead markers
- Words to display in Word Wall or Discussion Log, etc. include- function, input, output, rule, operation, inverse
- Chart paper and markers for each cooperative group

Development/Procedures:

1. Call the class to the front of the room and create a tone of suspense about the mysterious machine.
2. Explain that this function machine always changes whatever we put in it in the same way. It does something, but we don't know what it does!
3. Put numbered index cards in the Input slot and pretend to take out new index cards from the Output slot. Start with an input of 2 and an output of 4. For added effect, make silly or dramatic noises to simulate the workings of the machine.
4. Ask the students, "What do you think is going on in this function machine? What does it always do to the numbers we put in it?" Record their suggestions of possible rules. Accept many answers, including "add 2", "double", "go to the next even number", "add it to itself". Also record obviously incorrect suggestions such as "add 3" to test later.
5. Remind the students that this special function machine only does one thing to all numbers. Ask them for suggestions about how to decide which rule is the actual function. If necessary, steer them toward testing the rules with more input.
6. Use more input cards, being careful that they illustrate the rule "add 2". You may like to use pre-numbered cards or solicit suggestions for input from the students and write the numbers on the blank cards as you go. You may want to use E.P.R. (Every Pupil Response,) such as signaling with fingers, to show predictions of expected outcome.

7. Come to a consensus about what the rule is after several tests. Ask the students to justify how they are sure that this is the correct rule. Ask them to think, pair, and share about what the output would be if the input were 10,000.

8. Pretend to use a tool to change the function of the machine, so that it does something new. Some explanation is important for the children to understand that while you might use the same props, each function machine has a unique rule. Use another simple, one-step function such as "subtract 1". Encourage the children to predict output, infer the rule, and test the rule.

9. Display Teacher Resource Sheet # 1 on the overhead and explain that this is a new way of representing a function machine. Use another one step example using addition or subtraction.

10. After modeling examples for the whole class, separate the students into cooperative groups for reflection time. Since this activity is intended for the beginning of the school year, you may want to offer the students more guidance and support in writing a reflection. Students could think about the question, "Can you always predict the output of a function machine? Explain your thinking", discuss it with their group, and then work together to write a group response on chart paper. This reflection/writing exercise is a group assessment for this activity. Teachers may also circulate to listen to individual students' comments and take notes on their understanding.

Extension/Follow Up for the First Marking Period:

- Before using numbers in the function table, you could use familiar objects. For example, you could put in cards with pictures of uncooked cookies, an ice cream cone, and a pale-skinned child, and you could take out cards with pictures of browned cookies, a melted ice cream cone, and a sunburned child. The function for all of these would be getting hotter.

- You can connect these function activities to other math concepts, so that the students can have more practice without having to add on extra lessons. . For example, you could put geometric shapes in the input and then your output could illustrate functions like reflection ("flip") or rotation ("turn"). You can introduce functions using the operations of multiplication or division at a time when you want to use class time to focus on computation and algorithms.

- You can also connect these function activities to social studies and geography curriculum. For example, you could have input like "United States," "Brazil," and "Nigeria", and your output would be "North America", "South America", and "Africa." In this activity, the input would be a country and the output is on what continent you would find the input country.

- Function tables can be made more difficult by using two functions (See Teacher Resource Sheet # 3 or # 4). This is also a way for students to explore algebraic properties and discover the need for the order of operations. For example, after doing the rule "Add 2, Multiply by 5", you could do "Multiply by 5, Add 2".

- Another way to challenge the students is to give them the output and ask them to tell you what the input was. This will help you reinforce the relationship between the operations and introduce the idea of inverse operations.

- In addition to guiding the students in whole-class or cooperative group function activities, you can also have the students work with partners to create their own function machines for each other. A dry erase board can be used initially, and then students can

create more permanent pieces that could be reproduced. Many students enjoy designing creative machines to represent their rules. You may need to model designing a function machine, so the students see that they need to decide on the rule before interacting with a partner.

- Some teachers may want to introduce a center or workstation on function tables.
- Many instructional guides for teachers include reproducible worksheets involving function tables that range in format and difficulty.

Performance Assessment:

See Student Resource Sheet # 1: "Fernando's Function". Use Teacher Resource Sheet # 5: "Mathematics 4 Point Rubric" to help with grading the assessments. Here are two examples of a 4-point response:

> I think that Fernando is right. The rule is to add 25 and then subtract 14. I can tell this rule is right, because it works for every input and output on the function machine. $10 + 25 = 35$ and $35 - 14 = 21$. $52 + 25 = 77$ and $77 - 14 = 63$. I know that the way to find out if a rule is right is to test it with all the data. I used all the information on the machine and it always worked.

> * * *

> Fernando should slow down, because he might not be right! He said the rule was adding 25 and then subtract 14. Those two functions work every time. For example, $3 + 25 = 28$ and $28 - 14 = 14$. It works for all the other data, too. I'm not sure that's the rule, though, because some other functions would also work. Maybe the machine is subtracting two and then adding thirteen. That rule would also work. For example, I could use the input of 3 again. $3 - 2 = 1$ and $1 + 13 = 14$. I still get the same output. That happens with all the other numbers, too. I don't think we can be certain about the functions yet. If it was a one-function machine, I'd be sure the rule was to add 11, but I can think of a lot of things that would work for a two-function machine.

Second Marking Period: Terrific Tables

Sample Activity: Growing Money

Materials/Resources/Printed Materials:

- Words to add to display include - equation, relationship, variable, table, chart, column, row, term, sequence
- Real or model money (at least 10 dimes and 15 pennies per group)
- Chart paper and markers for each cooperative group
- Student math journals or paper for portfolios

Development/Procedures:

The lesson described below could be a culminating activity for this marking period. Please see the extension section to find appropriate activities to prepare students for concepts featured in this lesson.

1. Call the class to the front and arrange the coins to show the first term of the pattern.

   dime
   penny
   dime

2. Next, ask the students to predict the next term.
3. Show the second term.

	dime
dime	penny
penny	penny
dime	dime

4. Discuss students' predictions and ask them if they see a pattern emerging.
5. Show the third term.

		dime
	dime	penny
dime	penny	penny
penny	penny	penny
dime	dime	dime

6. Ask students to suggest a way to record the data to help us organize it. Ask, "What format can we use that will help us find a rule to help us know what future terms will look like?" Direct the students to go to their cooperative groups to work together to write examples of how they would organize the data (using the chart paper).
7. Ask the groups to post their chart paper. Give examples of questions we might need to answer, such as, "How many coins will be in the 10th term?" "How many pennies will be in the fifth term?" "What is the value of the coins in the 11th term?" (You may want to display these questions). Ask the children to study the different chart papers and discuss which table might be helpful to answer these kinds of questions. Encourage them to suggest changes that could be made to make the tables more useful. Below is one example of a table which could work:

Term	Number of Dimes	Number of Pennies	Total Number of Coins	Value of Coins in Term
1	2	1	3	$0.21
2	2	2	4	$0.22
3	2	3	5	$0.23
7	2	7	9	$0.27

8. Give each group a set of coins to manipulate as needed, and direct them to go to their seats to create their own charts in order to answer questions in their journals. Circulate around the groups, and write appropriate questions on sentence strips. Use your judgment to differentiate the difficulty of the questions based on the understanding of individuals and groups. Students should work collaboratively, but each child is responsible for showing his/her work in a math journal. The questions listed in step 7 would be fairly simple. Mid-range questions might be, "If you know the term, what is a rule for the total number of coins?" or "If you know the total number of coins, what is a rule for finding the number of pennies?" Some more difficult questions might be, "Will there ever be a term with a value of \$4.09?" or "What would the value of the whole arrangement of coins be after you have set down the 20th term?"
9. Carry on this exploration as long as you feel it is valuable. You may want to extend it to a multiple-day exploration, so the students can share their journal entries with other groups or you can do small group instruction to provide extra support or challenge as appropriate.

**Extension/Follow Up for the Second Marking Period:**
- Begin the marking period by using a table format for the Function Machines (see Teacher Resource 6). Make sure students are comfortable verbalizing the rules. For example, "Multiply by 4 and then subtract 3". Begin to model for them how they can express these rules as algebraic equations. For example, "(Input x 4) – 3 = Output" or "Input multiplied by four minus three equals the output." You should start this process with simple one-step functions, and talk about what a variable is and why you are choosing those letters to represent the unknowns.
- Engage the students in activities that will help them become comfortable creating tables and labeling variables. The activity described above uses money and decimals; it is possible to use activities that will connect with your existing curriculum. For example, you can use very basic story problems dealing with a science topic (like the growth of plants) that will help the students set up a table and label variables (D= number of days since seed was planted and H= height of plant in centimeters, etc.) Before expecting the students to recognize rules, help them use the table to look for many patterns and to make predictions about the next few terms.
- In order to help students recognize and test rules from tables, offer the students many opportunities to do hands-on explorations of patterns. Begin with a very simple problem with an obvious rule. For example, have the students use pattern blocks to build one cat with two ears (square body and two triangle ears). Have them add more cats. Help the students create a table with the variables C for number of cats and E for number of ears. Guide them to express a rule about the relationship between C and E by looking across their table (2 x C = E). Discuss how you can test this rule. Many instructional guides include examples of activities like these, and you can adapt them in order to make them better fit your existing curriculum.

Performance Assessment:

See Student Resource Sheet # 2: "Crazy Coins". Use your judgment to differentiate according to students' needs. For example, you might read the problem aloud for some students and only require them to answer the first prompt. You should have model money on hand so that students can choose to use the strategy of acting it out with manipulatives. Use Teacher Resource Sheet # 5: "Mathematics 4 Point Rubric" to help with grading the assessments. Here are two examples of a 4-point response for the second prompt:

I decided to draw a picture to help me figure it out.

One Chore   **Two Chores**   **Three Chores**

Four Chores

Five Chores
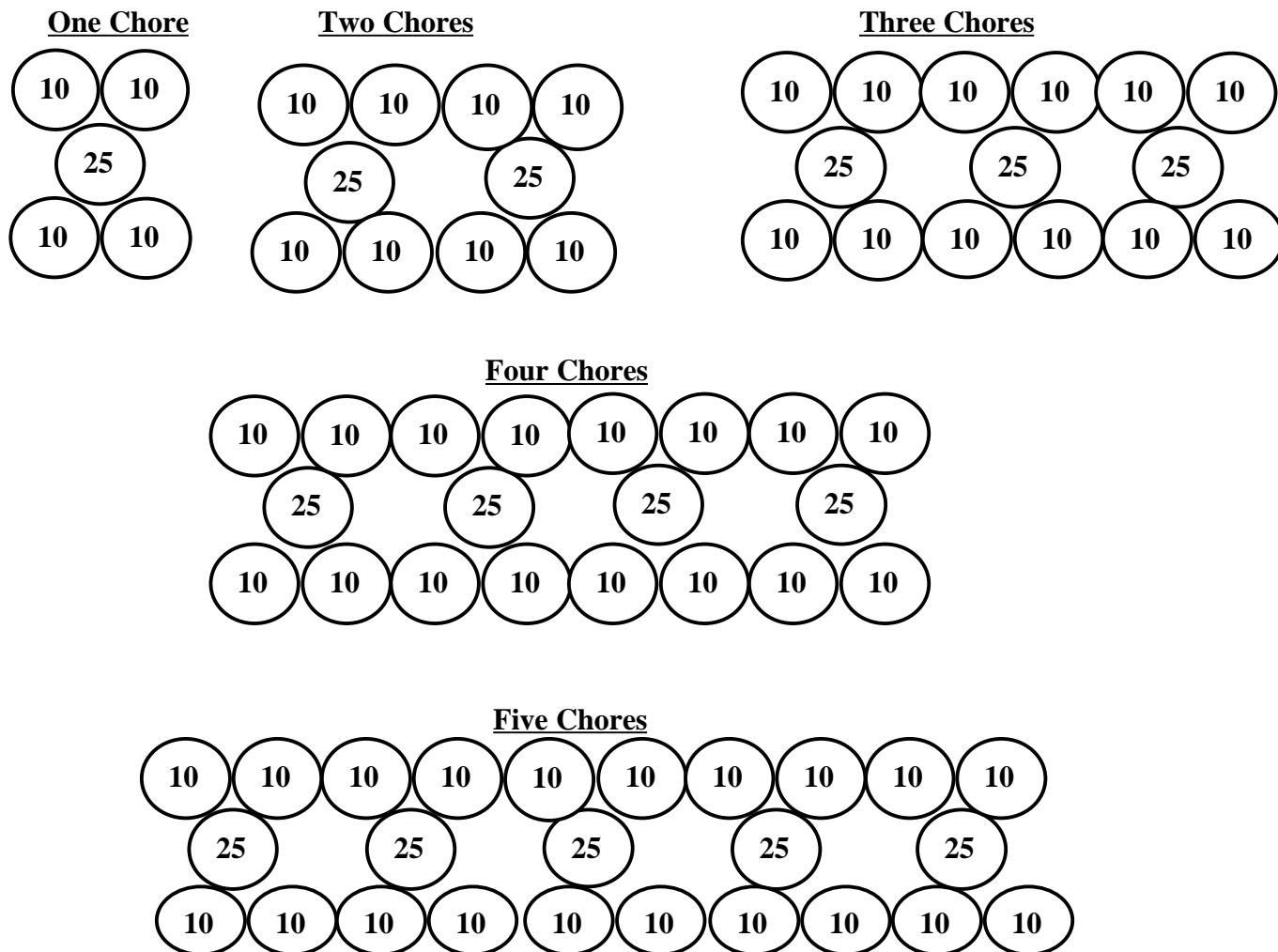
After I looked at my drawing, I saw the pattern. For every quarter, I drew 4 dimes. The number of quarters is always the same as the number of chores. To find the amount of dimes, I have to multiply the number of chores by 4. That means that when Maya does 12 chores, she will get exactly twelve quarters. 12 x 4 is 48. She will get 48 dimes. Now I have to figure out how much money that makes. I typed 12 x 25 in the calculator and it equals 300 cents, which is $3.00. Every dime is 10 cents, so 48 dimes is 480 cents or $4.80. $3.00 + $4.80= $7.80. Maya would earn 57dollars and 80 cents for all her work!

I decided to make a table to solve this problem.

Number of Chores	How Many Quarters	Value of Quarters	How Many Dimes	Value of Dimes	Total Money
1	1	$0.25	4	$0.40	$0.65
2	2	$0.50	8	$0.80	$1.30
3	3	$0.75	12	$1.20	$1.95
4	4	$1.00	16	$1.60	$2.60

When I look at my table, I can see the rules. The number of quarters is the same as the number of chores. C=Q. To get to the number of dimes, I have to multiply the number of chores by 4. C x 4 = D. That means there are 12 quarters and 48 dimes (12x4=48). I know that 4 quarters make one dollar, so 12 quarters make 3 dollars. 48 dimes is the same as 480 cents or $4.80. Maya earned $7.80.

Third Marking Period: Stories and Variables

Sample Activity: The Fun Field Trip to the Zoo

Materials/Resources/Printed Materials:
- Copy of Student Resource Sheet # 3 for each student
- Copy of Student Resource Sheet # 4 for each student
- See Teacher Resource Sheet # 7 for complete list of problems and answers.
- A retyped version of Teacher Resource Sheet # 8 with one sentence per page, cover, and colored illustrations, so that it has the format of a traditional children's picture book (This is an optional material – some teachers may prefer to just read aloud the passage as it is and engages the students in some other way)
- Student journals or paper for portfolios
- Overhead transparencies of student work (see step 8 below)

Development/Procedures:

Day One
1. Distribute Student Resource Sheet # 3 to each child. Ask them to complete the "Prairie Dog Families" problem independently as a warm-up activity.
2. After enough time, have the students do a museum walk and read at least three other students' responses. Discuss the different approaches to the problem together.
3. Call the students to the front for a read-aloud session. Read aloud the picture book version of "The Amazing Amazon" problem (Student Resource Sheet # 4). After reading it aloud, focus on the "Understand" stage of the four-step Problem-Solving Method. Ask the students what they remember from the story. Encourage them to make connections with the strategies that good readers use to comprehend. For example, they might use sensory imagery to make mental pictures of the information shown in the illustrations. Encourage any student requests to reread the story, and emphasize that this is always a good strategy when reading or solving story problems.
4. After emphasizing the most important data in the story and the meaning of the question asked, discuss how this story problem is different from the types of problems they have been solving in the second marking period.
5. Give the students time for silent reflection to do step two of the four-step Problem-Solving Method ("Plan and Choose a Strategy"). Have the students share about what they will do to solve this problem, and encourage them to make a table.
6. Organize the students into pairs and support them in doing step three of the Problem-Solving Method ("Solve").
7. Have the students write a journal entry on questions such as these, "How do you feel about the Amazon Animal problem? Do you think you have the right answer? Explain. Was there anything that was challenging or confusing about the problem? Is there anything you're unsure about?"
8. Collect the students' responses to "The Amazing Amazon" problem. Select approximately 3 student responses that you feel would be good discussion guides for the following day. You may want to select responses which show a variety of strategies, and it may be helpful to include a response which shows a misunderstanding that more than one student may have had. Create overhead transparencies of these student responses. Answer key can be found on Teacher Resource Sheet # 7.

Day Two
9. To do the "Check" step of the Problem-Solving Method, use the overhead transparencies to discuss different approaches to the problem. After the discussion, ask the students to write in their journals about new ideas they may have, or any changes in their thinking.
10. With the students' help, model the correct answer to the problem, being sure to show them that there is more than one way to find this answer.
11. Return Student Resource Sheet # 4 to each student, and ask the students to start the "Snack Time" problem independently. After five minutes, ask the students to stop and decide whether they would like to continue independently or work with their partners.
12. Share responses to the problem and ask the students if they tried a new approach after hearing their peers' ideas. (See Teacher Resource Sheet # 7 for answers.)

Extension/Follow Up for the Third Marking Period:

- Many instructional guides for teachers include two variable story problems that can be solved with a guess and check table (similar to the problems in our sample activity). The work with tables and variables that the students did in the second marking period should be very helpful in making this transition.
- You may want to make the problems more difficult by including stories that have two variables with a reliable pattern, so that they would be solved by finding the rule (rather than relying on the guess and check method).
- In the beginning, you may choose to give students more guidance and provide empty tables with the headings (variables) listed for them.
- Another way to support the students and help them make sense of the details and questions in the story would be to retype the story problems (one sentence per page) and have them illustrate the pages before solving the problem.
- After the students have solved these types of problems for a few weeks and feel comfortable with them, you may want to help them create their own problems. Begin by modeling and writing aloud. Be sure to emphasize how the writer needs to decide on the answer before giving the clues. Involve the students in deciding when you have enough clues for the problem to be solved - with only one possible correct answer. After writing aloud, you may want to involve the students in a shared writing of a problem. Next, move on to guided cooperative writing in groups, followed by partner story writing. Finally, students will be ready for independent composition. The students should follow the writing process, and end with final drafts that are in picture book form.

Performance Assessment:

See Student Resource Sheet # 5: "Robot Fun". Use Teacher Resource Sheet # 5: "Mathematics 4 Point Rubric" to help with grading the assessments. Here is one example of a 4-point response.

I will use a table, because I have to make a lot of guesses and that will help me check.

Number of Zipsters	Total Jobs Done by Zipsters	Number of Tombots	Total Jobs Done by Tombots	Total Jobs Done by All Robots	Jobs Equal 58?	5 More of One Type?
10	50	5	30	80	No – too high	Yes
9	45	4	24	69	No – too high	Yes
8	40	3	18	58	YES!	Yes

8 Zipsters and 3 Tombots are in the group. I know this is right, because there are 5 more Zipsters than Tombots. When I multiplied to find the work each kind of robot could do, and added up the jobs, the total was 58. I just kept guessing and using my chart to help me. I could tell that my first guesses were too high, so I went lower until I found the right one.

Suggestions for the Fourth Marking Period:
We have tried to make this unit very flexible, so that teachers have the ability to make changes according to their curriculum and the needs of their particular students. Some teachers may decide to use the entire school year to explore the concepts described in the above sections. For teachers who feel the class would benefit from stretching their thinking, there are many activities to choose from which would deepen students' understanding of algebra:
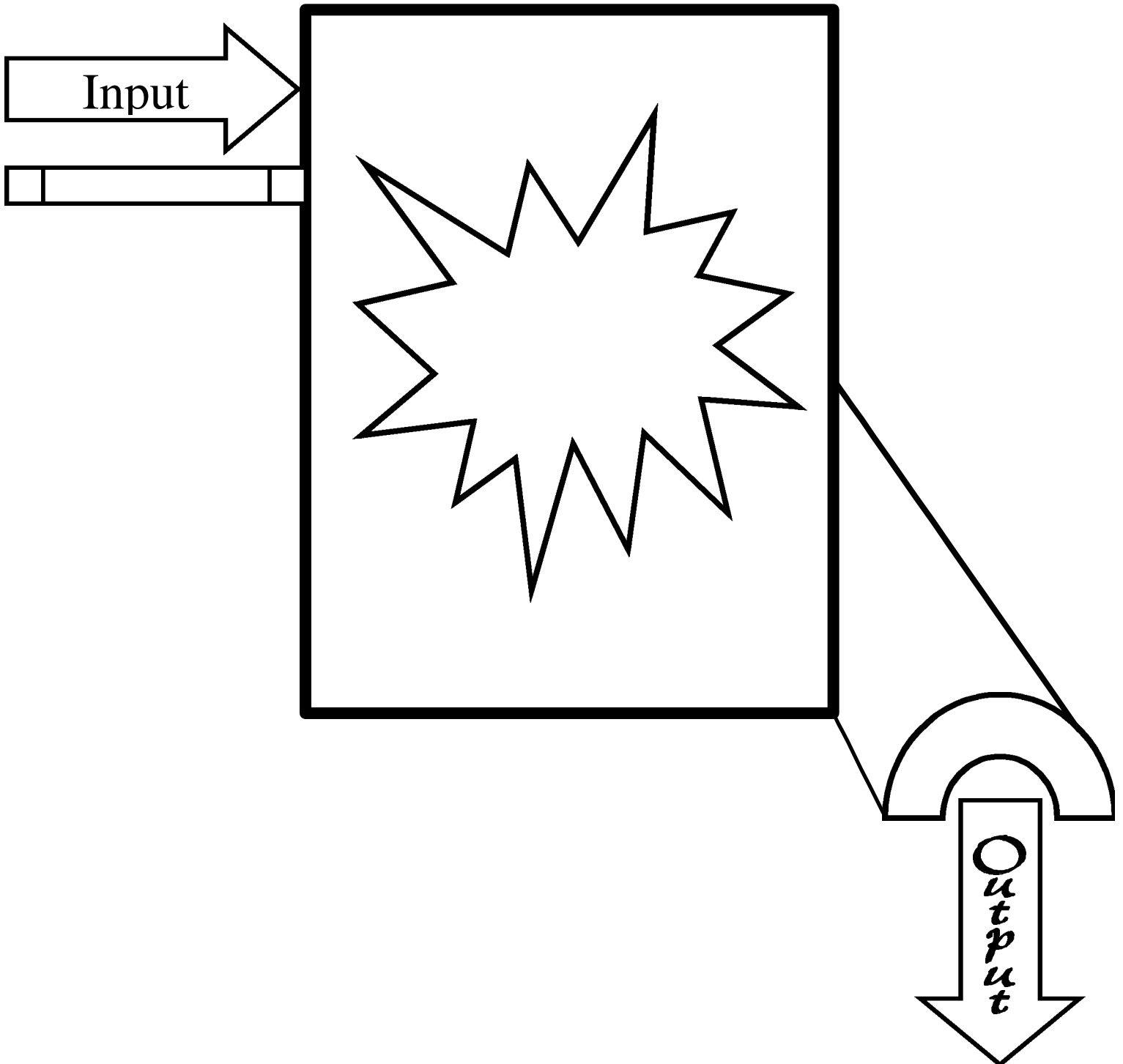
- Hands-On Equations
- Graphing the relationship between two variables
- Student-created practical application problems
- Story problems using deductive reasoning involving more than two variables
- Measurement and ratio explorations (that reinforce the concepts of equality and balance)

Authors:

Courtney Koestler
Bailey's Elementary School for the Arts & Sciences
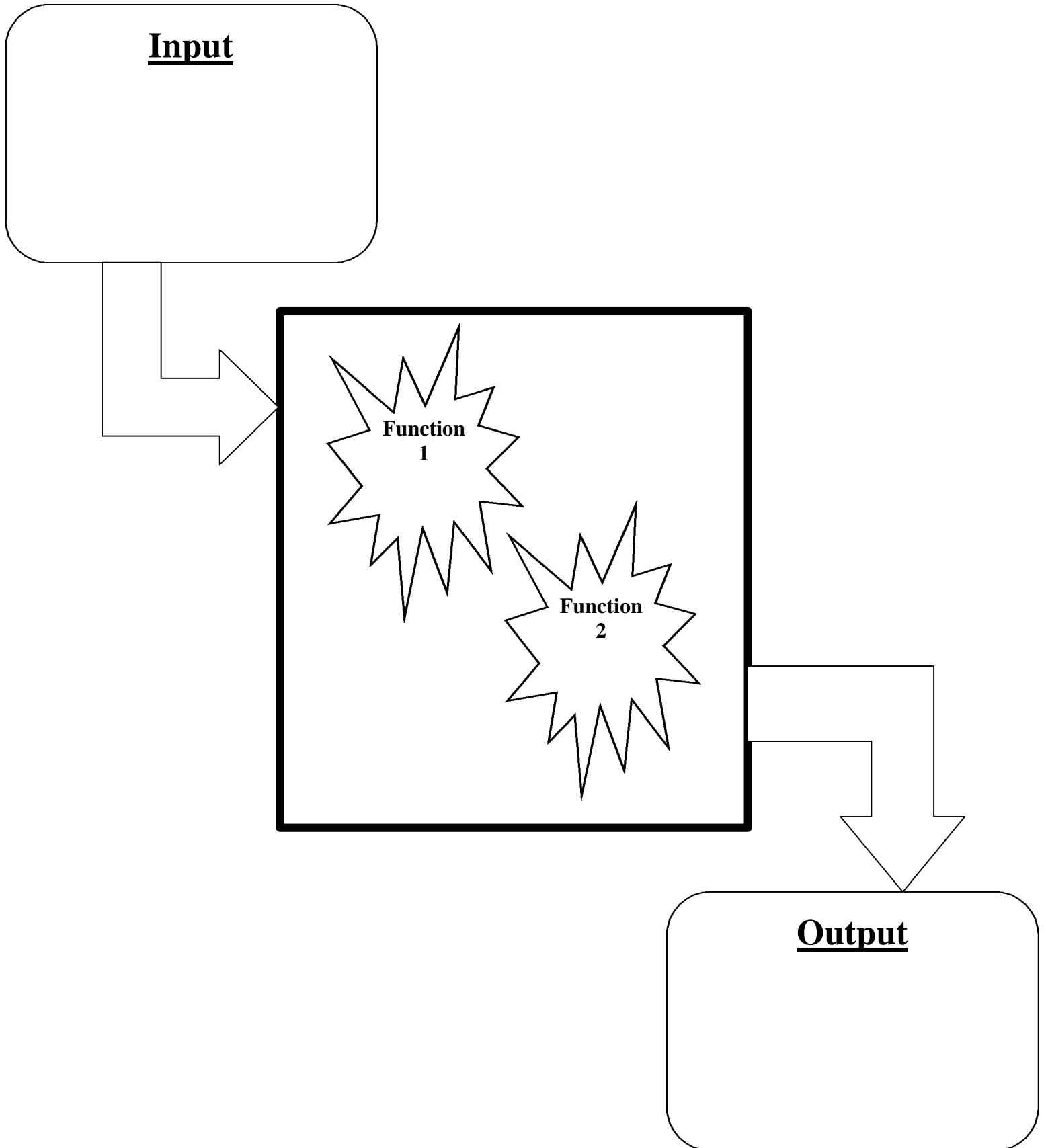Fairfax County Public Schools

Kerridwen Eliot
Diamond Elementary School
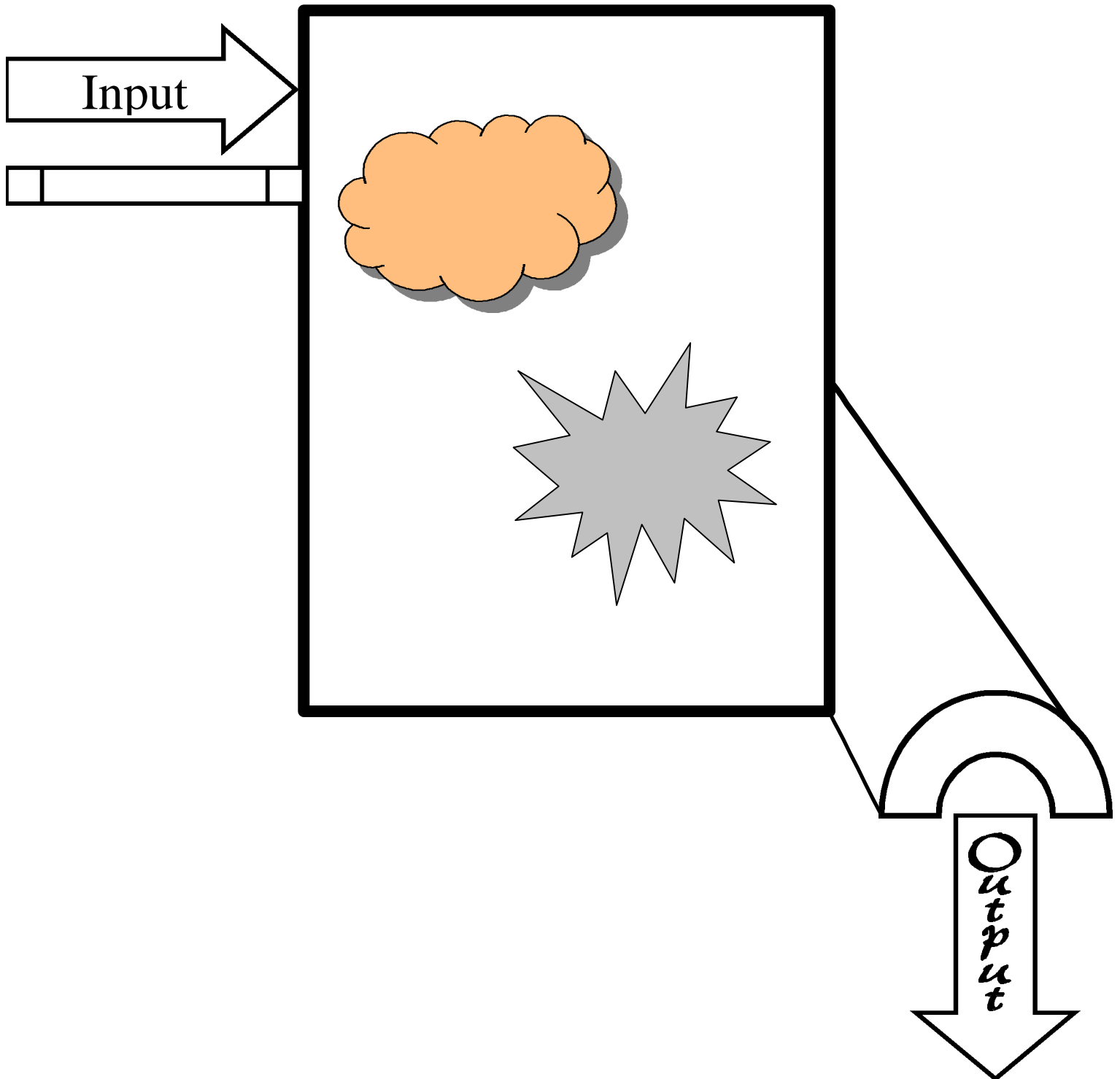Montgomery County Public Schools

Input

Output

Input

Function

Output

Input

Function 1

Function 2

Output

Input

Output

4	❖ The answer to the problem is correct. ❖ The answer is complete and responds to every part of the prompt fully. ❖ The answer offers a clear, detailed explanation that shows deep understanding of the math ideas. ❖ The student has shown his/her work by showing examples, labeled drawings, and/or number sentences. ❖ The answer includes mathematical language that is
3	❖ The answer to the problem is correct. ❖ The answer is complete and responds to every part of the prompt. ❖ The answer has a good explanation with less detail, and shows that the student has a good understanding. ❖ The student has shown some work. ❖ The answer includes some mathematical language or may not show the meaning of the words.
2	❖ The answer to the problem is correct - OR – ❖ The final answer is wrong, but the approach is reasonable. ❖ The answer may not be complete. ❖ The student has shown some work.
1	❖ The final answer is correct, but no work has been shown – OR – ❖ The child has shown his/her work and has a "glimmer" of understanding.
0	❖ The answer is off-topic (completely incorrect or irrelevant) – OR – ❖ There is no attempt at an answer.

Function Table

Input	Output
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Prairie Dog Families

The students in Ms. Bailey's class are going on a field trip to the zoo. The zoo tour guide takes them to the prairie dog town exhibit. In each town, there are many different sections with tunnels and rooms where groups of many different prairie dog families live. Many prairie dog families have one male prairie dog and up to four female prairie dogs with their young. In this particular exhibit, the families are made up of one male prairie dog and three female prairie dogs. If there are 36 prairie dogs in the exhibit, how many are males and how many are female?

9 males, 27 females

The Amazing Amazon

The students in Ms. Bailey's class make their way to the Amazon Rainforest Exhibit. When they arrive at the outdoor exhibit, they hear strange noises coming from the trees. The zoo guide tells the students that there are two different types of animals in this exhibit- panthers and toucans. She also tells them that there is a total of 20 legs and that there are a greater number of panthers than toucans. How many panthers and how many toucans are there in the exhibit?

4 panthers, 2 toucans

Snack Time

After spending about two hours looking at rodents, the panthers, and the toucans, they go to the cafeteria for a snack. There are two snacks for the students to buy, but not all the students want both. One snack is Panda Punch for 60 cents a cup. The other is Tiger Trail mix for 74 cents a bag with tax included. If students spent $9.24 altogether, how many cups of punch and how many bags of trail mix did they buy? (Hint: 4 more of one snacks were ordered.)

14 cups of punch, 10 bags of trail mix

The Amazing Amazon

The students in Ms. Bailey's class make their way to the Amazon Rainforest Exhibit. When they arrive at the outdoor exhibit, they hear strange noises coming from the trees. The zoo guide tells the students that there are two different types of animals in this exhibit- panthers and toucans. She also tells them that there are a total of 20 legs and that there are a greater number of panthers than toucans. How many panthers and how many toucans are there in the exhibit?

Name _____

Date _____

Fernando's Functions

You are sitting next to your friend, Fernando, in class. He always shouts out the answer before you get a chance to think. Your teacher showed you this 2-function machine.

INPUT

10
3
52
28

Function 1

Function 2

OUTPUT

21
14
63
39
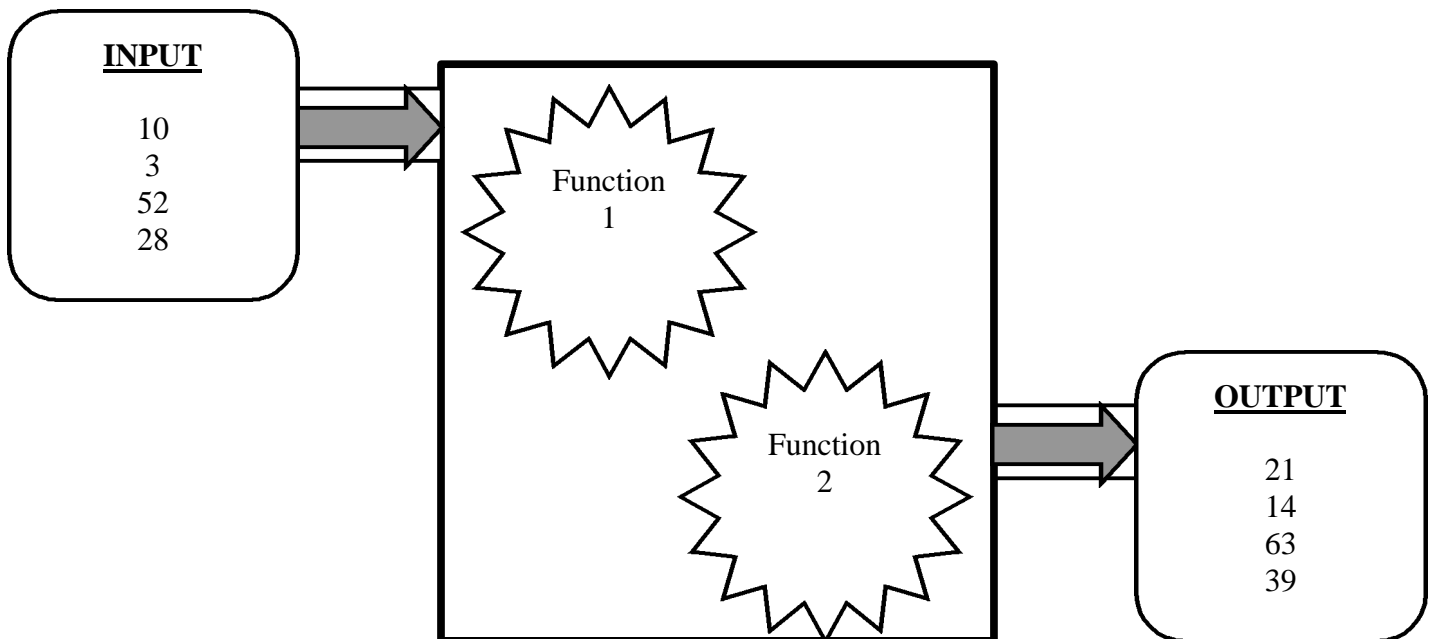
"I know the rule!" Fernando squealed. "First you add 25, and then you subtract 14!"

- Do you agree with Fernando?
- Are you certain about what the functions are? Why or why not?

Show your thinking on blank or lined paper. Make sure you justify your answer and give examples. Please look over the rubric to help you do your very best.

Crazy Coins

Maya's father agreed to begin paying her an allowance for chores that she does at home. He has decided to pay her on a sliding scale depending on the number of chores she decides to do on Saturdays. If she completes one chore, her allowance will be one quarter and four dimes. If she does two chores, she will earn two quarters and eight dimes. For three chores, she will receive three quarters and twelve dimes. This pattern of payment will continue, depending on the amount of chores she decides to do.

1. The first day of the new system, Maya is able to straighten up her room, help her parents make dinner, clear the kitchen table, put her school belongings away, and take out the trash. How much money does Maya earn? Use blank or lined paper to do your work. Remember to justify your answer. You may use a calculator.

2. The next few weeks, Maya continues. Then, after 5 weeks, she gets very ambitious. She wants to try to complete 12 chores. How much will Maya be paid if she does all twelve chores? Be sure to show all work, justify your answer, and describe any rule you use to solve the problem.

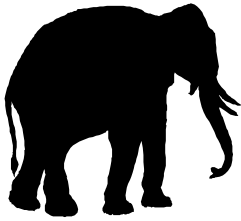# The Fun Field Trip to the Zoo

Prairie Dog Families

The students in Ms. Bailey's class are going on a field trip to the zoo. The zoo tour guide takes them to the prairie dog town exhibit.   In each town, there are many different sections with tunnels and rooms where groups of many different prairie dog families live. Many prairie dog families have one male prairie dog and up to four female prairie dogs with their young. In this particular exhibit, the families are made up of one male prairie dog and three female prairie dogs. If there are 36 prairie dogs in the exhibit, how many are males and how many are female?
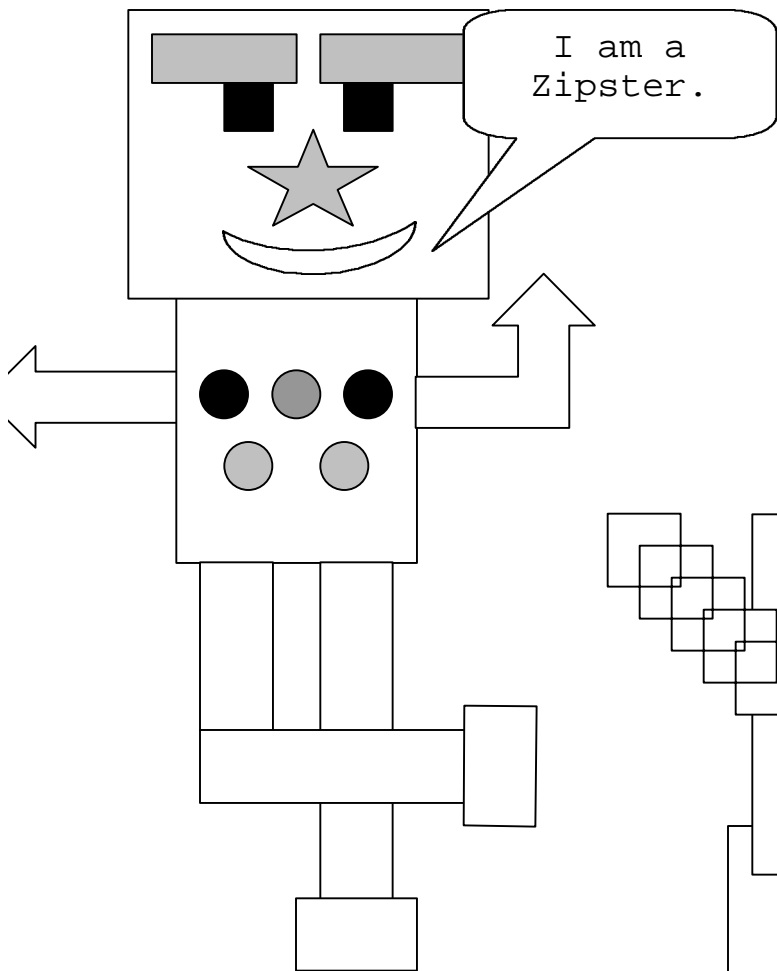
Name_____

Date_____

The Field Trip Continued

The Amazing Amazon

The students in Ms. Bailey's class make their way to the Amazon Rainforest Exhibit. When they arrive at the outdoor exhibit, they hear strange noises coming from the trees. The zoo guide tells the students that there are two different types of animals in this exhibit- panthers and toucans. She also tells them that there are a total of 20 legs and that there are a greater number of panthers than toucans. How many panthers and how many toucans are there in the exhibit?

Snack Time

After spending about two hours looking at rodents, the panthers, and the toucans, they go to the cafeteria for a snack. There are two snacks for the students to buy, but not all the students want both. One snack is Panda Punch for 60 cents a cup. The other is Tiger Trail mix for 74 cents a bag with tax included. If students spent $9.24 altogether, how many cups of punch and how many bags of trail mix did they buy? (Hint: 4 more of one snack was ordered.)

I am a
Zipster.

Name_____

Robot Fun

I am a
Tombot.
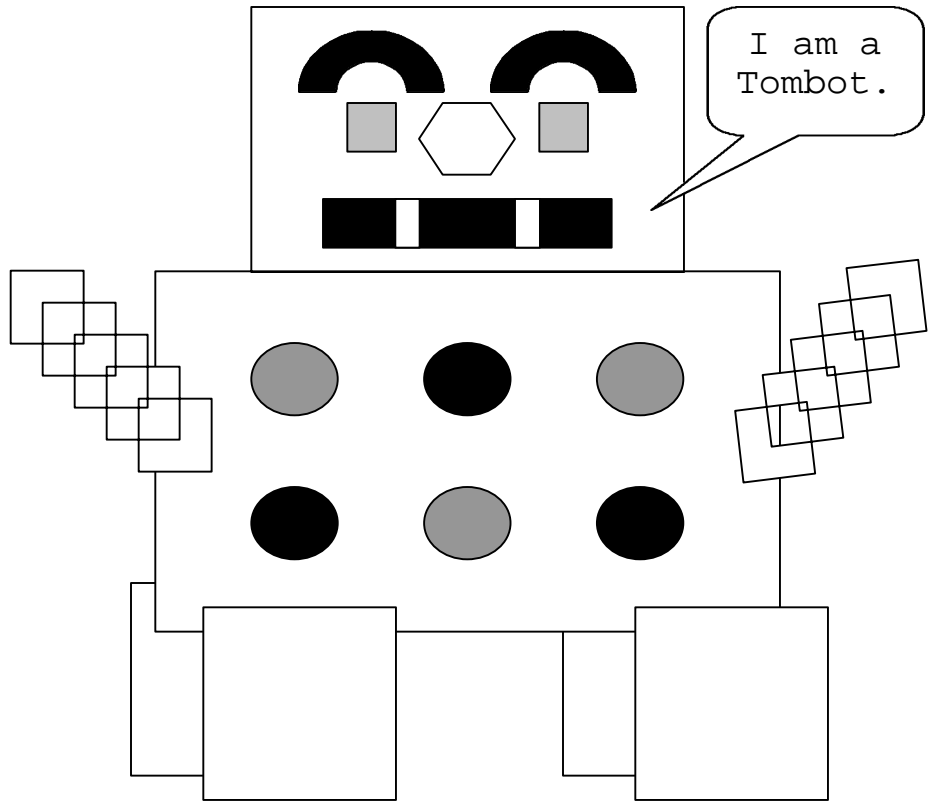
These two robots live on the planet Bazoodles. The number of round
buttons on each body is the number of jobs a robot can perform. If a
group of robots can perform 58 jobs together, how many Zipsters and
how many Tombots are there in the group? (Hint: There are 5 more of
one type of robot than the other.)

Use blank or lined paper to show all of your work. Be sure to explain your
answer.